Course Title:	Content Area:	Grade Level:	Credit (if applicable)
Grade 5 Mathematics	Math	5	N/A

Course Description:

The big ideas in grade 5 include: developing fluency with addition and subtraction of fractions, developing understanding of multiplication and division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions), extending division to two-digit divisors, developing understanding of operations with decimals to hundredths, developing fluency with whole number and decimal operations, and developing understanding of volume.

Aligned Core Resources:	Connection to the *BPS Vision of the Graduate*
Illustrative Math 360	**Collaboration** • Demonstrates ability to work effectively and respectfully with diverse teams • Assume shared responsibility for collaborative work and value the individual contributions made by each team member **Communication** • Articulates thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts • Listen effectively to decipher meaning, including knowledge, values, attitudes and intentions **Critical Thinking and Problem Solving** • Collect, assess and analyze relevant information • Reason effectively. Identify, define and solve authentic problems and essential questions • Reflect critically on learning experience, processes and solutions • Transfer knowledge to other situations

Additional Course Information: *Knowledge/Skill Dependent courses/prerequisites*	Link to *Completed Equity Audit*
N/A	Grade 5 Math Completed Equity Audit

Standard Matrix

M-Major Cluster, S-Supporting Cluster, A-Additional Cluster

District Learning Expectations and Standards	U1	U2	U3	U4	U5	U6	U7	U8
Operations and Algebraic Thinking								
Write and interpret numerical expressions.								
5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	A			A	A			
5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.	A	A		A	A		A	

Analyze patterns and relationships.								
5.OA.B.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.							A	
Write and interpret numerical expressions.								
5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	A			A	A			
5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.	A	A		A	A		A	
Number and Operations in Base Ten								
Understand the Place Value System								
5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.					M	M		
5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.						M		
5.NBT.A.3 Read, write, and compare decimals to thousandths.					M			
5.NBT.A.3.A Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).					M			
5.NBT.A.3.B Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.					M			

5.NBT.A.4 Use place value understanding to round decimals to any place.					M			
Perform operations with multi-digit whole numbers and with decimals to hundredths.								
5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.				M				
5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.				M				M
5.NBT.B.7: Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.					M			
Number and Operations - Fractions								
Use equivalent fractions as a strategy to add and subtract fractions.								
5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.						M		M
5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.						M		
Apply and extend previous understandings of multiplication and division.								
5.NF.B.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by		M						

4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?								
5.NF.B.4.A Interpret the product (a/b) × q as a part of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = (ac)/(bd).		M	M					
5.NF.B.4.B Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.		M	M					
5.NF.B.5 Interpret multiplication as scaling (resizing), by:						M		
5.NF.B.5.A Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.						M		
5.NF.B.5.B Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n × a)/(n × b) to the effect of multiplying a/b by 1.						M		
5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.			M			M		
5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.			M					
5.NF.B.7.A Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between			M					

multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.								
5.NF.B.7.B Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.			M					
5.NF.B.7.C Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?			M					
Measurement and Data								
Convert like measurement units within a given measurement system.								
5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.						S		
Represent and interpret data.								
5.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.						S		
Geometric measurement: understand concepts of volume.								
5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.	M			M				M
5.MD.C.3.A A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.	M							
5.MD.C.3.B A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.	M							

5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	M							
5.MD.C.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.	M			M				M
5.MD.C.5.A Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.	M							
5.MD.C.5.B Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.	M			M				
5.MD.C.5.C Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.	M							
Geometry								
Graph points on the coordinate plane to solve real-world and mathematical problems.								
5.G.A.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).							A	
5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.							A	
Classify two-dimensional figures into categories based on their properties.								
5.G.B.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that							A	A

category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.								
5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.							A	A

Unit Links

Unit 1: Finding Volume
Unit 2: Fractions as Quotients and Fraction Multiplication
Unit 3: Multiplying and Dividing Fractions
Unit 4: Wrapping Up Multiplication and Division with Multi-Digit Numbers
Unit 5: Place Value Patterns and Decimal Operations
Unit 6: More Decimal and Fraction Operations
Unit 7: Shapes on the Coordinate Plane

Unit Title

Unit 1: Finding Volume

Relevant Standards: Bold indicates priority

5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
5.MD.C.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
5.MD.C.3.A A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
5.MD.C.3.B A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.
5.MD.C.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
5.MD.C.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
5.MD.C.5.A Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.
5.MD.C.5.B Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.
5.MD.C.5.C Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems

<table>
<tr><th>Essential Question(s):</th><th>Enduring Understanding(s):</th></tr>
<tr><td>

- What does volume measure in a solid figure?
- How can we represent mathematical situations?

</td><td>

- Volume is an attribute of a three-dimensional solid figure that is measured in cubic units.
- Volume can be measured (or determined) by finding the total number of cubic units required to fill the space without gaps or overlaps
- The area of a base of a rectangular prism is found by multiplying the length by width ($b = \ell \times w$).
- In a right rectangular prism, any two parallel faces can be the bases.
- The volume of a rectangular prism can be found by multiplying the length by width by height ($\ell \times w \times h$) or by multiplying the area of the base by height ($b \times h$).
- A figure composed of rectangular prisms may be decomposed into two non- overlapping rectangular prisms whose volumes may be added to find the volume of the figure.
- Parentheses and brackets can be used in writing expressions to group numbers and operations together. There are multiple ways to write equivalent expressions to represent a given situation.
- There is a specific convention used to interpret and evaluate expressions. The information within parentheses and brackets are evaluated first.

</td></tr>
<tr><th>Demonstration of Learning:</th><th>Pacing for Unit</th></tr>
<tr><td>Checkpoints
Cool Downs
Unit Assessments</td><td>20 days (11 required lessons, 7 flex, 2 assessment and reaction)</td></tr>
<tr><th>Family Overview (link below)</th><th>Integration of Technology:</th></tr>
<tr><td>Family Support Video Unit 1
Family Support Materials Unit 1 (all languages)</td><td>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</td></tr>
<tr><th>Unit-specific Vocabulary:</th><th>Aligned Unit Materials, Resources, and Technology (beyond core resources):</th></tr>
<tr><td>

expression	parentheses	variable
interpret	volume	cubic units
multiplication	addition	rectangular prism
length	width	height

</td><td>ST Math
District - approved online resources</td></tr>
</table>

base area	formula	measurement
attribute	solid figure	unit cube
gap	overlap	cubic units
three-dimensional	space	solid figure
Associative property	Distributive property	Commutative property
decompose	composite	additive

Opportunities for Interdisciplinary Connections:	**Anticipated Conceptions:**
Grade 5 Science Unit 1: • Measuring volumes of different states of matter • Comparing volumes before and after mixing substances - Understanding conservation of matter through volume measurements Grade 5 Science Unit 3: • Measuring volumes of water in different reservoirs • Understanding distribution of Earth's water	When students hear the word volume, they often think of sound. Students will need real world examples of mathematical volume as well as hands-on experiences in order to fully grasp this concept. Students may think that rotating a prism changes its volume, not understanding that volume remains constant regardless of orientation. By stacking geometric solids with cubic units in layers, students can begin understanding the concept of how addition plays a part in finding volume. This will lead to an understanding of the formula for the volume of a right rectangular prism, b × h, where b is the area of the base. Students may think the term “base” only applies to the bottom layer of a prism rather than any two parallel faces. When solving the volume of composite shapes, students often struggle to properly visualize the shape as two separate rectangular prisms. They may also believe a prism can only be decomposed in one way, or have difficulty determining the lengths of the various sides of the composite shape.
Connections to Prior Units:	**Connections to Future Units:**
Grade 3 Unit 2	Grade 5 Unit 4 Grade 6 Unit 1
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement:- **Welcoming Interests & Identities** • Optimize relevance, value, and authenticity(7.2) • Nurture joy and play (7.3)	See Illustrative Math Teachers Guide for identified “Access for Students with Disabilities” by lesson and activity.

Representation - Access for Perception • Support multiple ways to perceive information (1.2) **Engagement - Sustaining Effort** • Foster collaboration, interdependence and collective learning (8.3)	

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Goals:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze** and **critique** the arguments of others orally and in writing.(4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	**Learning Target & Success Criteria**	**Assessment/ Resources**
Unit 1 Planning Map		
Section A	I can find the volume of a rectangular prism by counting unit cubes. ☐ Describe attributes of rectangular prisms composed of connecting cubes. ☐ Explain strategies for determining the volume of a solid object composed of unit cubes. ☐ Generalize that the volume of a rectangular prism composed of unit cubes is the product of the number of cubes in one layer and the total number of layers. ☐ Interpret a multiplication expression that represents the volume of a rectangular prism composed of unit cubes.	Cool downs Section Checkpoints Practice problems
Section B	I can apply a formula to find the volume of a rectangular prism. ☐ Understand that a "base" of a rectangular prism is a face of the prism. ☐ Describe how a multiplication expression represents the volume of a rectangular prism composed of unit cubes. ☐ Determine the volume of a rectangular prism, given a base and a corresponding height. ☐ Understand that the "length, the width, and the height" of a rectangular prism refer to the side lengths of the prism. ☐ Generate expressions that represent the volume of a rectangular prism. ☐ Understand that a "cubic unit" is the volume of a cube of side length 1 unit. ☐ Determine the information needed to find the volume of a rectangular prism. ☐ Identify appropriate stand units of measure for volume and justify the selection.	
Section C	I can find the volume of a figure composed of rectangular prisms.	

	☐ Explain strategies for calculating the volume of a figure composed of rectangular prisms, with visible unit cubes. ☐ Explain strategies for calculating the volume of a figure composed of rectangular prisms,in which unit cubes are not visible. ☐ Interpret an expression that represents the volume of a figure composed of rectangular prisms. ☐ Determine the volume of a figure composed of rectangular prisms and represent it with an expression. ☐ Explain strategies for finding the volumes of figures in real-world and mathematical problems.	

Unit Title:
Unit 2: Fractions as Quotients and Fraction Multiplication
Relevant Standards: Bold indicates priority
5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. **5.NF.B.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?** **5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.** **5.NF.B.4.A Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = (ac)/(bd).** **5.NF.B.4.B Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.**

Essential Question(s):	**Enduring Understanding(s):**
• How is a fraction related to division? • How does whole number computation relate to fraction computation? • How can models help us understand the multiplication and division of fractions?	• We can interpret a fraction as a division problem, where the numerator is divided by the denominator. • The denominator describes what number of equal parts a whole has been divided into. The numerator describes how many of the parts are considered. The numerator is a multiplier, e.g., $4/5 = 4 \times 1/5$. • A fraction represents division, so $a \div b = a/b$, e.g., $3 \div 4 = 3/4$. The denominator is the divisor. The numerator is the dividend. • Equal shares means each sharer gets the same sized part and no parts are discarded. The solution to an equal sharing problem can be shown with a fraction representing the relationship of the sharers and the amount. • The idea of the numerator as a multiplier can be used when a fraction is being multiplied by a whole number, e.g., Just as $5/8 = 5 \times 1/8$, 5 groups of 3/8 equals $5 \times 3/8 = (5 \times 3) \times 1/8$ which equals 15/8. • A variety of models, including arrays, number lines, fraction strips, etc. can be used to represent the multiplication of a whole number by a fraction. • The properties of whole number computation can be applied to computation with fractions.

Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	Unit Pacing: 25 days (15 required lessons, 8 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
Family Support Video Unit 2 Family Support Materials Unit 2 (all languages)	*Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning*
Unit-specific Vocabulary:	**Aligned Unit Materials, Resources, and Technology (beyond core resources):**
<table><tr><td>expression</td><td>parentheses</td><td>variable</td></tr><tr><td>evaluate</td><td>interpret</td><td>fraction</td></tr><tr><td>mixed number</td><td>numerator</td><td>denominator</td></tr><tr><td>equal parts</td><td>interpret</td><td>solve</td></tr><tr><td>product</td><td>partition</td><td>equivalent</td></tr><tr><td>factor</td><td>unit fraction</td><td>area</td></tr><tr><td>side lengths</td><td>division</td><td>dividend</td></tr><tr><td>divisor</td><td>quotient</td><td>represent</td></tr></table>	ST Math District - approved online resources
Opportunities for Interdisciplinary Connections:	**Anticipated Conceptions:**
Grade 5 Social Studies Unit 1: • Relating fractions to colonies and fractions of colonists affected by hardships Grade 5 Science Unit 3: • Understanding part-whole relationships - Analyzing distribution of Earth's water - Representing data with fractional quantities - Calculating percentages of resources	Students may believe that you can not divide a smaller number by a larger number. (i.e. 3 ÷ 4 = ¾). When creating a model to represent fraction multiplication and division situations, students do not correctly attend to the whole. When working with contextual problems, students may not attend to the meaning of the numerals in the problem in relation to the operation involved. Students may believe that multiplication always results in a larger number (i.e. 2 x 8 = 16 vs. ½ x 8 = 4).
Connections to Prior Units:	**Connections to Future Units:**
Grade 3 Unit 2 Grade 3 Unit 4 Grade 4 Unit 3	Grade 5 Unit 3

Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Representation - Access for Perception • Support opportunities to customize display of information (1.1) • Support multiple ways to perceive information (1.2)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Goals:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze** and **critique** the arguments of others orally and in writing.(4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	**Learning Target & Success Criteria**	**Assessment/ Resources**
Unit 2 Planning Map		
Section A	I can interpret and represent a fraction as a division problem. ☐ Explain a strategy for solving a whole-number division story problem with a solution that is a fraction. ☐ Interpret a diagram that represents a whole-number division story problem with a solution that is a fraction. ☐ Use a whole-number division expression to represent a story problem with a solution that is a fraction. ☐ Use a division equation to represent a whole-number division story problem with a solution that is a fraction. ☐ Explain a strategy for solving an unknown factor, whole number division story problem with a solution that is a fraction. ☐ Interpret division situations and equations where the unknown is the numerator, denominator of the value of the quotient.	Cool downs Section Checkpoints Practice problems

Section B	I can represent a fraction x whole number with a model and solve to find the product. ☐ Describe how equivalent multiplication and division expressions can represent the same diagram. ☐ Use a diagram to represent a whole number division story problem with a rational solution. ☐ Describe how a fraction and different, equivalent expressions, represent the same diagram. ☐ Explain a strategy for determining the product of a whole number and a fraction.	
Section C	I can find the area of a rectangle with fractional side lengths. ☐ Explain a strategy for determining the area of a rectangle with a whole number side length and a unit fraction side length. ☐ Determine the area of a rectangle with a whole number side length and a rational side length less than 1 and represent it with a multiplication expression. ☐ Describe how different equivalent multiplication expressions represent the area of a given rectangle with fraction side lengths greater than 1. ☐ Explain strategies used to determine the area of a rectangle with fractional side lengths and represent the area with a multiplication expression. ☐ Explain strategies for determining the area of a rectangle with fractional side lengths greater than 1 by decomposing it. ☐ Interpret the area of a rectangle which includes a fractional side length expressed as a mixed number. ☐ Identify different numerical expressions that represent the same area of a rectangle with fractional side lengths greater than 1. ☐ Determine what information is needed to solve a multi-step area problem involving multiplication of a whole number and a fraction. ☐ Explain strategies for determining unknown factors or products in area contexts that involve a mixed number.	

Unit Title:
Unit 3: Multiplying and Dividing Fractions
Relevant Standards: Bold indicates priority
5.NF.B.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. **5.NF.B.4.A Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = (ac)/(bd).** **5.NF.B.4.B Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.** **5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.** **5.NF.B.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.** **5.NF.B.7.a Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.** **5.NF.B.7.b Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.** **5.NF.B.7.c Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?**

Essential Question(s):	**Enduring Understanding(s):**
• How can models help us understand the multiplication and division of fractions? • How does whole number computation relate to fraction computation?	• A variety of models, including arrays, number lines, fraction strips, etc. can be used to represent the multiplication of a whole number by a fraction. • The relationship between multiplication and division can help us reason about fraction division. Contextual situations are also imperative to help students reason about the computation. • A variety of models, including arrays, number lines, fraction strips, etc. can be used to represent the multiplication of a whole number by a fraction. • The properties of whole number computation can be applied to computation with fractions. • Solving word problems with addition, subtraction, multiplication and division of fractions follow the same problem solving structures as for whole number situations.

<table>
<tr><th>Demonstration of Learning:</th><th>Pacing for Unit</th></tr>
<tr><td>Checkpoints
Cool Downs
Unit Assessments</td><td>Unit Pacing: 28 days (17 required lessons, 9 flex, 2 assessment and reaction)</td></tr>
<tr><th>Family Overview (link below)</th><th>Integration of Technology:</th></tr>
<tr><td>Family Support Video Unit 3
Family Support Materials Unit 3 (all languages)</td><td>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</td></tr>
<tr><th>Unit-specific Vocabulary:</th><th>Aligned Unit Materials, Resources, and Technology (beyond core resources):</th></tr>
<tr><td>
<table>
<tr><td>fraction</td><td>numerator</td><td>denominator</td></tr>
<tr><td>product</td><td>partition</td><td>equal parts</td></tr>
<tr><td>quotient</td><td>division</td><td>equivalent</td></tr>
<tr><td>factor</td><td>unit fraction</td><td>area</td></tr>
<tr><td>side lengths</td><td></td><td></td></tr>
</table>
</td><td>ST Math
District - approved online resources</td></tr>
<tr><th>Opportunities for Interdisciplinary Connections:</th><th>Anticipated Conceptions:</th></tr>
<tr><td>Grade 5 Social Studies Unit 1:
• Relating fractions to colonies and fractions of colonists affected by hardships

Grade 5 Science Unit 1:
• Finding parts of mixtures - Determining proportions in materials - Calculating material proportions - Planning and testing solutions</td><td>Students may believe that multiplication always results in a
larger number (i.e. 2 x 8 = 16 vs. ½ x 8 = 4). Students may believe that you can not divide a smaller number by a larger number. (i.e. 3 ÷ 4 = ¾).

When creating a model to represent fraction multiplication and division situations, students do not correctly attend to the whole.

When working with contextual problems, students may not attend to the meaning of the numerals in the problem in relation to the operation involved.

The idea of the numerator as a multiplier can be used when a fraction is being multiplied by a whole number, e.g., Just as 5/8 = 5× 1/8 , 5 groups of 3/8 equals 5 × 3/8 = (5×3)× 1/8 which equals 15/8.</td></tr>
<tr><th>Connections to Prior Units:</th><th>Connections to Future Units:</th></tr>
<tr><td>Grade 3 Unit 4
Grade 4 Unit 3</td><td>Grade 6 Unit 4</td></tr>
<tr><th colspan="2">Differentiation through Universal Design for Learning</th></tr>
<tr><th>UDL Indicator</th><th>Teacher Actions:</th></tr>
</table>

Representation-Perception • Support multiple ways to perceive information (1.2) **Action and Expression - Expression & Communication** • Build fluencies with graduated support for practice and performance (5.3)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Goals:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze** and **critique** the arguments of others orally and in writing.(4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 3 Planning Map		
Section A	I can represent a fraction multiplication problem using models and equations and solve to find the product. I can find the area of a rectangle with fractional side lengths. ☐ Represent a unit fraction of a unit fraction of a whole with a diagram and interpret the diagram. ☐ Describe how diagrams and expressions represent the product of 2 unit fractions. ☐ Calculate the product of 2 unit fractions. ☐ Interpret a diagram and an equation that represent the product of 2 unit fractions. ☐ Represent a diagram with a multiplication expression involving a unit fraction and a non-unit fraction to represent a diagram in context. ☐ Explain strategies to determine the product of a unit fraction and a non-unit fraction. ☐ Represent the product of a unit fraction and a non-unit fraction with diagrams and expressions and interpret the representations. ☐ Determine the product of 2 non unit fractions represented by a diagram. ☐ Calculate the product of 2 fractions. ☐ Interpret a diagram that represents the product of 2 mixed numbers. ☐ Explain strategies for finding the product of fractions or mixed	Cool downs Section Checkpoints Practice problems

	numbers. ☐ Interpret a fraction multiplication equation that represents an area in context.	
Section B	I can represent a fraction division problem using models and equations and solve to find the quotient. ☐ Generalize how the size of the dividend or divisor affects the size of the quotient. ☐ Describe how a diagram and division expression represent a unit fraction divided by a whole number in context. ☐ Represent a unit fraction divided by a whole number in a context with a diagram. ☐ Represent a situation with an equation involving the division of a whole number by a unit fraction and interpret the equation ☐ Compare and contrast diagrams and equations that represent dividing a whole number by a fraction. ☐ Generate a situation to represent a division expression with a whole number and a unit fraction. ☐ Explain strategies for determining whether a quotient involving a whole number and a unit fraction is greater than or less than 1.	
Section C	I can solve problems involving fraction multiplication and division. ☐ Determine what information is needed to solve fraction multiplication or division problems in context. ☐ Solve fraction multiplication and division problems in context. ☐ Generate both multiplication and division equations to represent situations in context. ☐ Justify that either a division or a multiplication equation can represent the same situation.	

Unit Title:	
Unit 4: Wrapping Up Multiplication and Division with Multi-Digit Numbers	
Relevant Standards: Bold indicates priority	
5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. 5.OA.A.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. **5.NBT.B.5 Fluently multiply multi-digit whole numbers using the standard algorithm.** **5.NBT.B.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.** **5.MD.C.5.B Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.**	
Essential Question(s):	**Enduring Understanding(s):**
• How can understanding place value help us? • How do the properties of operations make computation simpler? • How are multiplication and division related? • How can we represent mathematical situations?	• Understanding place value enables us to represent, compare order and round numbers and perform computations. • Properties of operations allow us to reorder, decompose and/or compose numbers in order to make computation simpler. • There are different algorithms that can be used to multiply. • Real-world mathematical situations can be represented using concrete models or drawings. • Patterns and structures can be generalized when multiplying and dividing whole numbers. • There is a relationship between multiplication and division. • Equations, rectangular arrays, and/or area models can be used to illustrate and explain division. • Real-world mathematical situations can be represented using concrete models or drawings.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	Unit Pacing: 28 days (18 required lessons, 8 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
Family Support Video Unit 4 Family Support Materials Unit 4 (all languages)	*Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning*

Unit-specific Vocabulary:			Aligned Unit Materials, Resources, and Technology (beyond core resources):
expression	parentheses	algorithm	ST Math District - approved online resources
Standard algorithm	evaluate	variable	
interpret	Distributive property	volume	
cubic units	multiplication	addition	
rectangular prism	base area	formula	
factors	product	rectangular arrays	
partial products	quotient	dividend	
divisor	calculate	Associative property	
Commutative property	decompose	length	
width	height		

Opportunities for Interdisciplinary Connections:	Anticipated Conceptions:
Grade 5 Science Unit 1: • Computing volumes of different materials - Measuring and comparing substance quantities - Analyzing conservation of matter through volume	When students don't attend to place value, they may not understand the magnitude of the numbers they are multiplying or dividing and therefore make computational errors. When working with contextual problems, students may not attend to the meaning of the numerals in the problem in relation to the operation involved.
Connections to Prior Units:	**Connections to Future Units:**
Grade 4 Unit 6	Grade 5 Unit 5

Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Building Knowledge • Connect prior knowledge to new learning (3.1) **Action and Expression - Expression & Communication** • Build fluencies with graduated support for practice and performance (5.3)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Goals:**
An EL can... • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze** and **critique** the arguments of others orally and in writing.(4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 4 Planning Map		
Section A	I can solve multi-digit multiplication problems using the standard algorithm. ☐ Describe strategies for multiplying multi-digit numbers. ☐ Explain strategies for estimating products. ☐ Interpret diagrams that represent the product of a two-digit and a three-digit number. ☐ Label diagrams to represent the product of a two-digit number a a three-digit number and find the value. ☐ Interpret different ways to record partial products. ☐ Show how partial products can be used to multiply multi digit numbers. ☐ Explain how using partial products relates to using the standard algorithm when multiplying multi-digit numbers. ☐ Interpet the steps in the standard algorithm used to multiply multi-digit numbers. ☐ Use the standard algorithm to multiply multi-digit numbers without composing new units. ☐ Use the standard algorithm to multiply multi-digit numbers with composing new units. ☐ Solve real-world multiplication problems.	Cool downs Section Checkpoints Practice problems
Section B	I can represent and solve multi-digit division problems. ☐ Explain strategies for dividing a multi-digit number by a one-digit number. ☐ Represent a division situation with an expression . ☐ Identify and interpret expressions that show partial quotients for dividing a three-digit by a two-digit number. ☐ Describe the steps used to divide a three-digit number by a two-digit number, with partial quotients. ☐ Calculate the quotients of three-digit numbers divided by two-digit numbers and explain the strategies used. ☐ Explain strategies for determining if a quotient is reasonable.	

	☐ Divide up to four-digit dividends by two-digit divisors, and compare and contrast the strategies used. ☐ Use the relationship between multiplication and division to solve problems involving area and volume and explain the strategies used.	
Section C	I can apply a formula to find the volume of a rectangular prism. ☐ Explain strategies for estimating products and quotients of multi-digit numbers. ☐ Use multiplication and division of multi-digit numbers to solve problems involving area and volume and explain the reasoning used.	

Unit Title:
Unit 5: Place Value Patterns and Decimal Operations
Relevant Standards: Bold indicates priority
5.OA.A.1 Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols. **5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.** **5.NBT.A.3 Read, write, and compare decimals to thousandths.** **5.NBT.A.3.a Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).** **5.NBT.A.3.b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.** **5.NBT.A.4 Use place value understanding to round decimals to any place.** **5.NBT.B.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.**

Essential Question(s):	**Enduring Understanding(s):**
• How is our number system organized? • How can understanding place value help us? • How do the properties of operations make computation simpler?	• Our number system is a base-ten system. A given place value is ten times greater than the value of the place to its right (500 is ten times greater than 50) and 1/10 the value of the place to its left (0.3 is 1/10 the value of 3). • Understanding place value enables us to represent, compare order and round numbers and perform computations. • When reading a decimal number, the decimal point is read as “and”. • In a decimal number, digits to the right of the decimal point are named by the appropriate unit: tenths, hundredths, thousandths. and are read followed by the name of the appropriate unit, i.e. 1.438 is read as one and four hundred thirty eight thousandths. • Decimals to thousandths can be expressed in standard form, word form, and expanded form. • Two decimals to thousandths can be compared using the symbols >, =, and <. • Understanding place value enables us to represent, compare, order and round numbers and perform computations. • Understanding place value enables us to represent, compare order and round numbers and perform computations. These patterns exist for both whole numbers and decimals. • Properties of operations allow us to reorder, decompose and/or compose numbers in order to make computation simpler. The same

	properties of operations for whole numbers work with decimal numbers.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	Unit Pacing: 35 days (24 required lessons, 9 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**
Family Support Video Unit 5 Family Support Materials_Unit 5 (all languages)	*Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning*
Unit-specific Vocabulary:	**Aligned Unit Materials, Resources, and Technology (beyond core resources):**
pace value / decimal / decimal point tenths / hundredths / thousandths place value chart / greater than > / less than < equal to = / comparison / expanded form round / Associative property / Commutative property Identity property / sum / difference product / quotient / patterns factors / multiples	ST Math District - approved online resources
Opportunities for Interdisciplinary Connections:	**Anticipated Conceptions:**
Grade 5 Science Unit 1: • Relating decimals to measuring and recording masses of substances before/after mixing - recording precise measurements Grade 5 Science Unit 3: • Describing distribution of water on Earth using percentages and decimals	When trying to extend their understanding of whole number place value to decimal place value, students may believe that as you move to the right of the decimal point, the number increases in value, i.e. 6 hundredths is larger than 6 tenths. Students may also try to apply whole number concepts when comparing decimals by looking only at the number of digits. However, with decimals a number with one decimal place may be greater than a number with two or three decimal places. For example, 0.5 is greater than 0.12, 0.009 or 0.499. Students may not attend to place value when adding or subtracting decimals by ignoring the idea that they

	need to add like place values as with whole number addition and subtraction. For example, students might line up decimals to add or subtract from left to right or right to left not attending to the place value of the digits. Students may believe that multiplication always results in a larger product. Students may just perform decimal computation without assessing the reasonableness of their answer. It is essential that students think about the relative magnitude of the numbers in both the problem as well as their answer.
Connections to Prior Units:	**Connections to Future Units:**
Grade 4 Unit 4 Section A Grade 4 Unit 3 Section C Grade 4 Unit 6 Section C	Grade 6 Unit 5
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement - Welcoming Interests & Identities • Optimizing choice and autonomy (7.1) **Engagement - Sustaining Effort** • Foster collaboration, interdependence and collective learning (8.3) **Representation - Building Knowledge** • Connect prior knowledge to new learning (3.1)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Goals:**
An EL can... • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze** and **critique** the arguments of others orally and in writing.(4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 5 Planning Map		
Section A	I can read, write, and represent decimals to the thousandths place. ☐ Interpret diagrams that represent 0.1, 0.01 and 0.001.	Cool downs

	☐ Represent decimals to thousandths with a diagram and diagrams with a decimal number. ☐ Represent decimals in expanded form. ☐ Represent decimals on a number line. ☐ Describe relationships between tenths, hundredths and thousandths. I can compare two decimals using the symbols <, > or =. ☐ Explain strategies for comparing decimals. ☐ Use a number line to compare decimals and represent the comparison using the symbols <, >, or =. ☐ Compare decimals and represent the comparison using the symbols <, >, or =. I can round decimals to any place. ☐ Explain strategies for rounding decimal numbers to the nearest whole number, tenth and hundredth. ☐ Use place-value understanding to estimate the location of a decimal to thousandths. ☐ Interpret the impact of rounding decimals in a context.	Section Checkpoints Practice problems
Section B	I can add and subtract decimals to the hundredths using a variety of strategies. ☐ Describe strategies for adding decimal numbers to hundredths. ☐ Use place-value strategies to estimate and calculate the sum of decimals to hundredths. ☐ Explain strategies for adding decimals to hundredths. ☐ Describe strategies for subtracting decimal numbers to hundredths. ☐ Use place-value strategies to estimate and calculate the difference of decimals to hundredths. ☐ Explain strategies for subtracting decimals to hundredths. ☐ Calculate sums and differences of decimals to hundredths and explain the strategies used.	
Section C	I can multiply decimals using a variety of strategies. ☐ Describe strategies for multiplying a 1-digit whole number and a decimal number. ☐ Identify and interpret diagrams and expressions that represent the product of a whole number and a decimal number. ☐ Calculate products of a whole number and a decimal and explain strategies used. ☐ Match decimal multiplication expressions that have equivalent values and justify reasoning. ☐ Calculate the product of 2 decimals to tenths and explain strategies used. ☐ Calculate the product of 2 decimals to hundredths and explain strategies used.	

Section D	I can divide decimals using a variety of strategies. ☐ Explain strategies for dividing a whole number by one tenth or one hundredth. ☐ Generalize that dividing a decimal by one tenth is equivalent to multiplying it by 10. ☐ Generalize that dividing a decimal by one hundredth is equivalent to multiplying it by 100. ☐ Calculate quotients of a decimal divided by tenths or hundredths. ☐ Interpret diagrams and expressions that represent dividing a whole number by tenths or hundredths. ☐ Calculate quotients of a decimal to the hundredths divided by a whole number and explain strategies used. ☐ Calculate quotients of a decimal divided by one tenth or one hundredth and explain the strategies used. ☐ Interpret diagrams that represent dividing a decimal by one tenth or one hundredth.	

Unit Title:
Unit 6: More Decimal and Fraction Operations
Relevant Standards: Bold indicates priority
5.NBT.A.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. **5.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.** **5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)** **5.NF.A.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*** **5.NF.B.5.a Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.** **5.NF.B.5.b Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence a/b = (n×a)/(n×b) to the effect of multiplying a/b by 1.** **5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.** 5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. 5.MD.B.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different

measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Essential Question(s):	**Enduring Understanding(s):**
• What is the relationship between units of measure in each system? • How can equivalent fractions be used to add and subtract fractions with unlike denominators? • Why do we collect, organize, represent and analyze data? • How is the size of a factor related to the size of the product when multiplying a given fraction?	• Conversions in the U.S. customary system vary depending upon what is being measured. Conversions in the metric system are based on powers of ten. • When converting from a larger unit to a smaller unit, there will be more iterations of the smaller unit. For example, when converting from yards to feet, there will always be a greater number of feet than yards. • When converting from a smaller unit to a larger unit, there will be less iterations of the larger unit. For example, when converting from cups to gallons, there will always be fewer gallons than cups. • Measurements can be converted to solve multi-step real-world problems. • Our number system is a base-ten system. A given place value is ten times greater than the value of the place to its right (500 is ten times greater than 50) and 1/10 the value of the place to its left (0.3 is 1/10 the value of 3). • In the base-ten system, the value of each place is 10 times the value of the place to the immediate right and 1/10 of the value to its immediate left. • Equivalent fractions can be used to replace given fractions to make calculations simpler. • We decompose fractions into sums or products of fractions to make computation easier or to simplify expressions. • Fractions can be added and subtracted when the wholes are the same size and the fractional parts (denominators) are the same. • Fractions with different denominators can be added and subtracted by replacing each fraction with an equivalent fraction expressed with a like denominator. • A fraction with a numerator larger than the denominator can be expressed as a mixed number or a fraction greater than one; both are correct representations. • Expressing a mixed number as a fraction, e.g., 2 3/5 = 13/5 , may be useful when solving a fraction problem. • An equation can be used to describe a mathematical situation involving fractions. • Solving word problems with addition, subtraction, multiplication and division of fractions follow the same problem solving structures as for whole number situations. • We can make observations and assumptions about how factors will impact the product based upon the size of one factor compared to the size of the second factor. For example, we can say that 7 x 56 is 7 times as big as 56 without performing the calculation to find the product. The resulting product will be larger than either of the two factors.

<table>
<tr><td></td><td>

- When multiplying a given fraction by a factor, the product will either be greater than, equal to, or less than the fraction depending on how the factor compares to 1.
- We collect, organize, represent, and analyze data in order to answer a question or solve a problem.
- Data can be organized and represented in a picture graph, a bar graph, or a line plot.
- Symbols used in line plots should be consistently spaced and sized for visual accuracy.

</td></tr>
<tr><td>Demonstration of Learning:</td><td>Pacing for Unit</td></tr>
<tr><td>Checkpoints
Cool Downs
Unit Assessments</td><td>20 days (11 required lessons, 7 flex, 2 assessment and reaction)</td></tr>
<tr><td>Family Overview (link below)</td><td>Integration of Technology:</td></tr>
<tr><td>Family Support Video Unit 6
Family Support Materials Unit 6 (all languages)</td><td>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning</td></tr>
<tr><td>Unit-specific Vocabulary:</td><td>Aligned Unit Materials, Resources, and Technology (beyond core resources):</td></tr>
<tr><td>

base	power	exponent
cubed	equivalent fraction	sum
difference	numerator	denominator
unlike denominator	like denominator	factor
product	scaling	convert
measurement units	Metric system	Customary system
mixed numbers	benchmark fractions	estimate
line plot	interpret	data

</td><td>ST Math
District - approved online resources</td></tr>
<tr><td>Opportunities for Interdisciplinary Connections:</td><td>Anticipated Conceptions:</td></tr>
<tr><td>Grade 5 Science Unit 1:

- Converting between measurement scales - Analyzing mixture proportions
- Recording precise measurements in experiments
- Recording and comparing measurements

</td><td>Students may incorrectly evaluate powers of ten, for example thinking 10 to the 2nd power is 20.

Students may not pay attention to the unit of measurement when solving problems that require renaming units. For example, when subtracting 2 inches from 5 feet, students may</td></tr>
</table>

	simply subtract 2 from 5 and say the answer is 3. Students may add or subtract fractions without first finding equivalent fractions with the same denominator. Students may misapply whole number concepts to adding and subtracting fractions, for example treating the numerator and denominator as separate numbers rather than understanding fractions as numbers. Students may not understand that when multiplying a given fraction by a factor, the product can either be greater than, equal to, or less than the fraction depending on how the factor compares to 1.
Connections to Prior Units:	**Connections to Future Units:**
Grade 4 Unit 3 Grade 4 Unit 5	Grade 6 Unit 1 Grade 6 Unit 8
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
Engagement - Welcoming Interests & Identities • Optimize relevance and value authenticity (7.2) **Representation - Building Knowledge** • Connect prior knowledge to new learning (3.1)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Goals:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze** and **critique** the arguments of others orally and in writing.(4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	**Learning Target & Success Criteria**	**Assessment/ Resources**
Unit 6 Planning Map		
Section A	I can explain patterns when multiplying and dividing by powers of 10. ☐ Generalize in a multi-digit number pattern, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.	Cool downs Section Checkpoints Practice problems

	☐ Use exponential notation to represent powers of ten. I can solve problems involving measurement conversions. ☐ Determine the factor needed to convert from a larger to a smaller metric length unit. ☐ Determine the divisor needed to convert from a smaller to a larger metric length unit. ☐ Explain strategies for solving problems that require the conversion of units of length and/or volume.	
Section B	I can add and subtract fractions with unlike denominators. ☐ Explain strategies for adding and subtracting fractions with unlike denominators when one is a multiple of the other. ☐ Explain strategies for adding and subtracting fractions with unlike denominators when one is not a multiple of the other. ☐ Explain strategies for adding and subtracting mixed numbers. I can solve word problems involving fraction addition and subtraction. ☐ Interpret and add and subtract fractions and mixed numbers in context. I can create line plots to display fractional measurement data, and use the information to solve problems. ☐ Interpret and create line plots with fractions and mixed numbers. ☐ Determine the information needed to answer questions about a line plot with fractions and mixed numbers.	
Section C	I can explain the magnitude (size) of a product based on the factors. ☐ Explain strategies for comparing A x B when A is a fraction and B is a whole number. ☐ Explain strategies for ordering A x B and C x B when A and C are fractions and B is a whole number. ☐ Justify why A x B > B if A>1 and A x B<B if A<1 when A is a fraction and B is a whole number. ☐ Justify why A x B > B if A>1 and A x B<B if A<1 when A and B are fractions.	

Unit Title:
Unit 7: Shapes on the Coordinate Plane
Relevant Standards: Bold indicates priority
5.OA.B.3 Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule “Add 3” and the starting number 0, and given the rule Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.

5.G.A.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
5.G.A.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
5.G.B.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.
5.G.B.4 Classify two-dimensional figures in a hierarchy based on properties.

Essential Question(s):	**Enduring Understanding(s):**
How can we describe an object's location in space? How can two-dimensional figures be described, classified and analyzed?	• We analyze patterns to determine how they change and identify relationships. • Ordered pairs generated from given rules can be graphed on a coordinate plane. • Coordinate graphs show relationships between numbers on a coordinate grid. • The coordinate system is created from a horizontal number line (x-axis) and a vertical number line (y-axis) with the intersection of the lines at zero (the origin). • A given point can be located in the plane by using an ordered pair of numbers (x, y). • The origin of the coordinate plane is represented by the ordered pair (0, 0). • The first number in an ordered pair, the x-coordinate or x, indicates how far to travel from the origin in the horizontal direction. • The second number in an ordered pair, the y-coordinate or y, indicates how far to travel in the vertical direction. • Distance is found by counting intervals rather than counting the grid marks. • Real-world situations can be represented by graphing points in the coordinate plane. • Coordinate values can be interpreted in the context of real-world situations. • Shapes can be named and classified by angle measures, side lengths, or the presence or absence of parallel and perpendicular lines.
Demonstration of Learning:	**Pacing for Unit**
Checkpoints Cool Downs Unit Assessments	20 days (11 required lessons, 7 flex, 2 assessment and reaction)
Family Overview (link below)	**Integration of Technology:**

Family Support Video Unit 7 Family Support Materials_Unit 7 (all languages	*Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning*
Unit-specific Vocabulary:	**Aligned Unit Materials, Resources, and Technology (beyond core resources):**
numerical pattern, rule, ordered pair vertical, horizontal, intersect point, axis, x-axis y-axis, origin, x-coordinate y-coordinate, attribute, category plane figure, quadrilateral, properties two-dimensional, hierarchy, rhombus parallel lines, perpendicular lines, square rectangle, parallelogram, trapezoid	ST Math District - approved online resources
Opportunities for Interdisciplinary Connections:	**Anticipated Conceptions:**
Grade 5 Science: Unit 3: • Graphing hours of daylight in Hartford and Antarctica each month on a coordinate grid	Students may reverse the order of the coordinates when plotting points on a coordinate plane. They count up first on the y-axis and then count over on the x-axis. Students think that when describing geometric shapes and placing them in subcategories, the last category is the only classification that can be used. When students are asked to describe the relationship between two patterns, they may focus on each pattern in isolation instead of looking for a multiplicative relationship between the two.
Connections to Prior Units:	**Connections to Future Units:**
Grade 3 Unit 5 Grade 4 Unit 6 Grade 4 Unit 8	Grade 6 Unit 7
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**

Representation - Language and Symbols • Clarify vocabulary, symbols, and language structures (2.1) **Action and Expression - Expression & Communication** • Use multiple tools for construction, composition and creativity (5.2)	See Illustrative Math Teachers Guide for identified "Access for Students with Disabilities" by lesson and activity.
Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Goals:**
An EL can… • **participate** in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions. (4-5.2) • **construct** grade appropriate oral and written claims and support them with reasoning and evidence. (4-5.4) • **analyze** and **critique** the arguments of others orally and in writing.(4-5.6) • **adapt** language choices to purpose, task, and audience when speaking and writing (4-5.7)	See Illustrative Math Teachers Guide for identified lesson "Goals"

Lesson Sequence	Learning Target & Success Criteria	Assessment/ Resources
Unit 7 Planning Map		
Section A	I can identify and plot points on a coordinate grid. ☐ Ask questions to identify a specific shape on a coordinate grid. ☐ Describe a shape on a coordinate grid. ☐ Determine the coordinates of a point in a coordinate grid. ☐ Draw the label points in the coordinate plane. ☐ Generalize that when two points have the same first coordinate they lie in the same vertical line.	Cool downs Section Checkpoints Practice problems
Section B	I can classify shapes in a hierarchy based on properties. ☐ Ask questions to identify specific quadrilateral ☐ Determine and describe attributes of rectangles, rhombuses, squares, trapezoids, and parallelograms. ☐ Compare and contrast two different quadrilaterals with the same perimeter. ☐ Determine the relationships between rectangles, rhombuses, squares, trapezoids, and parallelograms. ☐ Describe attributes of right triangles. ☐ Match triangles based on given attributes.	
Section C	I can generate a pattern based on a given rule. ☐ Use additive rules to determine a sequence of values. ☐ Draw the graph of a set of coordinate pairs. ☐ Determine coordinates for points in a plane based on numerical patterns.	

	☐ Interpret the coordinates of a point in context. ☐ Represent information about a context as a point in the coordinate plane. I can identify and describe the relationships and corresponding terms in two patterns. ☐ Generalize the relationship between two sequences generated from additive rules. ☐ Represent the relationship between the length and width of a rectangle with a fixed area (or perimeter) in the coordinate plane.	